compared to standard pelleted feed. In contrast, productivity was significantly affected by the meal diet ($p<0.05$), resulting in a poorer feed conversion compared to standard pelleted feed (Table 2).

Table 2. *Effect of a Salmonella optimised diet on productivity of finisher pigs. Values with different subscripts differ at the 95% confidence interval.*

Parameters	Diet		
	Pelleted feed	Meal feed	Salmonella optimised pelleted feed
FUp/pig/day	2.42	2.45	2.50
Average daily gain (g)	900	834	895
Meat percent	60.1	60.5	60.3
Production value (EUR)	108[a]	88[b]	102[a]
Index	100	82	95

Discussion and conclusion: Our results indicate that pelleted feed may reduce *Salmonella* prevalence in finishing pigs, when *Salmonella* reducing factors such as acid, barley and course grinding are included in the diet. In contrast to meal feed, the optimised diet did not significantly reduce pig performance but the production cost of the optimised pelleted diet is higher.

The observation that a wheat based meal diet failed to reduce *Salmonella* prevalence in finishers significantly compared to a standard pelleted diet, is in contrast to previous experiences. However, as Table 1 clearly shows the effect of meal diet differed quite remarkably between the two herds. The high seroprevalence in meal fed pigs in herd A may be due to the fact that this herd was placed in Level 3 of the *Salmonella* Control Program (indicating a high infection level in the herd) during most of the investigation period. The results in herd B are in accordance with previous studies, even though this herd also experienced a rise in seroprevalence during the study period.

Our results show that an optimised, wheat based pelleted diet containing barley, sugar beet pulp and organic acids is able to reduce *Salmonella* seroprevalence in finishers without significant negative effects on productivity. The optimised diet is therefore a suitable alternative to meal feed and standard pelleted feed. The results furthermore illustrate that feeding strategies alone are not sufficient to combat Salmonella.

O 46 Effect of feeding strategy on Salmonella in Danish sows and weaners

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Summary: The aim of this study was to investigate the effect of feeding strategy on Salmonella prevalence in sows and weaners. The owners of 228 sow herds were interviewed about their feeding strategy with regard to 1) use of home mixed meal feed contra pelleted feed, 2) heat-treated protein contra non-heat-treated protein (soy protein), 3) contents of high-fibre grain types (barley, oat and

sugar beet pellets) contra wheat, 4) use of organic acids in feed or drinking water, and 5) liquid/fermented feed contra dry feed. The answers were compared with the bacteriological and serological Salmonella data from each herd. No statistical significant effects were found of feeding strategy on Salmonella in these groups. Other factors like housing, management, cleaning and disinfection were not included in this study, and therefore their effect cannot be excluded.

Keywords: Salmonella, feeding strategy, barley, soy protein, organic acids.

Materials and methods: From January to June 2003, 228 Danish herd owners that had received a request for having their herds tested microbiologically according to the Danish Salmonella Control Program, were interviewed about feeding strategy in sows and weaners: home-mixed meal feed vs. pelleted feed, use of non-heat-treated soy protein vs. heat-treated protein in home-mixed feed, ratios of barley, wheat, oat, and sugar beet pellets, use of organic acid in feed and/or drinking water, and liquid feed vs. dry feed (the time of fermentation was not included in the query). The following age categories were included: Pregnant sows, lactating sows, and weaners. The weaners were typically fed 2 or 3 different types of feed from 7 to 30 kg of weight.

Using Fisher's Exact Test in SAS, the five feeding parameters and combinations hereof were tested against the results from the pen faecal samples. 42% of the tested herds were culture positive. The parameters were also tested against percent positive pen faecal samples. Furthermore, the five parameters were tested against the serological results from meat juice sampling in the 79 herds with finishers.

Results: The feeding strategy in the herds is shown in Table 1. 52% of the herds used organic acids for the weaners in drinking water or feed. The concentration in drinking water was typically 0,2% while the acid contents in feed typically were below 0,5% and often not available (not written on the declaration).

Table 1. *Feed type use in the interviewed herds. .# explained under "discussion."*

Feeding strategy	Sows	Weaners
Home-mixed meal feed	50%	33%
Soy protein in home-mixed feed	53%	21%
25% or 15% barley, oat or sugar beet pulp #	70%	78%
Organic acids	0%	52%
Liquid feed (partly fermented)	21%	21%

Table 2 shows the type of feed for sows factors compared with the microbiological results from pen faecal samples. Some herds used more than one type of feed for the group. These are not included in the table.

Table 2. *Correlation between sow feed and prevalence of Salmonella positive pen fecal samples.*

Type of sow feed	Number of positive herds (%)	Number of herds	P-value (Chisquare)
Pelleted	49 (48 %)	102	0.09
Home-mixed	36 (36 %)	97	

No significant differences were found on 5% level, but a clear tendency was observed (see Table 2). Herds with positive microbiology or more than 40 percent positive meat juice samples included approx. 50% of the herds. When the five feeding parameters were tested against this group, there was no significant difference either. The prevalence of Salmonella was higher (not significantly)

among the herds using organic acids for the weaners. As expected there was a positive correlation between microbiology and serology. Thus, the chance of finding Salmonella in pen faecal samples was higher with increasing serology.

Discussion: The criteria for the query were based on research in the Danish swine production, primarily the Salmonella reducing effect of meal feed in finishers, and use of acids in water and feed for weaners, finishers and sows (J_rgensen et al., 2001, Kj_rsgaard et al., 2001). There are two important biases in this investigation that make it difficult to show a clear effect. Firstly, only herds that have delivered pigs to finisher herds in level 2 or 3 are included. Kranker et al. (2001) demonstrated that buying pigs from infected sow herds is a main risk factor. This means that Salmonella-negative herds have less risk of being tested. The other important bias is that sow herds with a production of finishing pigs can have the request cancelled, if they can demonstrate, that their finishers are serologically negative. These herds are more likely to use protective management and feed factors, but are not included in this study.

Despite these results, we were able to demonstrate a tendency towards a protective effect of home-mixed meal. Among herds using organic acids in feed or drinking water for the weaners a higher, not significant Salmonella prevalence was found. This tendency might reflect the veterinarian's recommendation to start using acid in Salmonella-positive herds. The relatively low acid content in the feed and drinking water is another possible explanation. Factors like live-pig trading habits, continuing housing/all-in all-out, general management; cleaning and disinfection were not included in the query. These factors are known to play important roles concerning Salmonella reduction.

Conclusions: The results of this study confirm previous results that describe a larger complexity regarding Salmonella in sow herds compared to finisher herds. Use of the general recommendations for feed intervention against Salmonella in pigs did not results in clear-cut, reducing effects on Salmonella in sows and weaners. Other measures such as cleaning, disinfection and management may be more important.

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O 47 Feeding fermented liquid feed to the gestating sow can reduce pathogen challenge of the neonatal environment

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Summary: This study demonstrated that the coliform and *E. coli* challenge to the newborn piglet can be reduced by feeding sows fermented liquid feed (FLF). The faeces excreted by sows fed FLF